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IS 7283 (1992): Hot rolled bars for production of bright bars and machined parts for enginner ing applications [MTD 4: Wrought Steel Products]

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(पहला पुनरीक्षण)

Indian Standard

HOT-ROLLED BARS FOR THE PRODUCTION OF BRIGHT BARS AND MACHINED PARTS FOR ENGINEERING APPLICATIONS — SPECIFICATION

(First Revision)

UDC 669·14-422-122·4

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 1992 **Price Group 2**

Wrought Steel Products Sectional Committee, MTD 4; and Steel Bars Subcommittee, MTD 4 : 4

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1974. Keeping in view the requirements laid down in IS 9550 : 1980 'Bright bars', the rolling tolerances has been narrowed down. Provision for decarburization and macroetch test has been included.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HOT-ROLLED BARS FOR THE PRODUCTION OF BRIGHT BARS AND MACHINED PARTS FOR ENGINEERING APPLICATIONS — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard covers the requirements of hot-rolled bars for the production of bright bars by cold drawing, turning or grinding or a combination of these processes and also for the production of machined parts for the engineering application.

1.1.1 This standard does not cover the requirements for special steels including tool steels, ball bearing steels, spring steels and silver steel.

2 REFERENCES

The following Indian standards are the necessary adjuncts to this standard:

IS No.	*Title*
3739 : 1987	Dimensional tolerances for carbon and alloy constructional steel products (*first revision*)
3848 : 1981	Method for end quench test for hardenability of steel (*first revision*)
4163 : 1982	Method for determination of inclusion content in steel by macroscopic method (*first revision*)
4748 : 1988	Methods for estimating average grain size of metals (*first revision*)
6396 : 1983	Method of measuring decarburized depth of steel (*first revision*)
8910 : 1978	General technical delivery requirements for steel and steel products
9550 : 1980	Bright bars

3 SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall conform to IS 8910 : 1978.

3.2 Subject to the agreement between the purchaser and the manufacturer steel covered in this standard shall be ordered and delivered to any one or a combination of the following characteristics:

a) Chemical composition,

b) Mechanical properties in:
   as rolled
   or normalised
   or annealed condition,

c) Surface quality,

d) Grain size,

e) Hardenability,

f) Inclusion content, and

g) Others (as agreed upon at the time of inquiry and order).

4 MANUFACTURE

4.1 Steel shall be manufactured by any process except the bessemer process. It may be followed by secondary refining or vacuum melting. Steel shall be supplied semi-killed or killed.

4.2 Steel bars may be rolled from ingots, billets or continuously cast billets. In case of ingots, sufficient discard shall be made to ensure freedom from piping, segregation and other harmful defects.

4.3 The size of the ingots, billets or continuously billets for a given size of the finished product shall be such that the minimum reduction ratio of 16 : 1 in case of ingots and billets, and 8 : 1 in case of continuously cast billets; from the minimum cross sectional area of the ingot, billets or continuously cast billet to the maximum cross sectional area of the product is ensured. However, the reduction ratio other than that specified may be agreed subject to the mutual agreement between the purchaser and the manufacturer.

4.4 The hot-rolled bars should be processed castwise and despatched accordingly.

5 MATERIAL

5.1 The chemistry of the material shall conform to that of any steel of the Indian Standards Specification or as mutually agreed upon between the manufacturer and the purchaser.

5.2 Free cutting steels either sulphurised or leaded may be supplied by mutual agreement between the purchaser and the manufacturer.

NOTES

1 Lead analysis shall be done from product sample only, since it is not possible to have laddle sample analysis for lead.

2 Sulphur or lead should be uniformly distributed in the cross-section of the product.

6 FREEDOM FROM DEFECTS

6.1 The bars shall be rolled to dimensions specified. The finished material shall be reasonably free from cracks, surface flaws, laminations and other harmful defects. Unless otherwise agreed between the purchaser and the manufacturer, the permissible limits shall be as specified in Table 1.

6.1.1 The hot-rolled bars should be suitably tested for cracks and other surface defect along with the guarantee certificate.

6.2 Sulphide inclusion, and segregation bands which are characteristics of free cutting steel shall not be considered as defects in the material.

6.3 Test specimens representative of the cross section of the material shall be pickled in hydrochloric acid 1 : 1 at a temperature 70 to 80°C. The specimens after macroetch shall be free from pipe, excessive porosity, harmful segregation, internal cracks and macro inclusions.

Table 1 Permissible Depth of the Surface Defects for Black Bars

(*Clause* 6.1)

Dimensions, mm		Depth of Defects, mm		
Over	Up to and including	Grade 1	Grade 2	Crack Tested (Round, Square, Hexagon and Flat)
(1)	(2)	(3)	(4)	(5)
6	8	0·13	0·26	
8	12	0·15	0·30	
12	14	0·18	0·36	
14	20	0·25	0·50	By agreement between the purchaser and the manufacturer
20	25	0·28	0·56	
25	32	0·30	0·60	
32	42	0·35	0·60	
42	53	0·40	0·80	
53	63	0·60	1·20	
63	80	0·80	1·60	
80	100	1·00	2·00	
Above 100 mm		By agreement		

NOTES

Grade 1 — recommended for drawing, turning and grinding.

Grade 2 — recommended for the production of machined parts for general engineering purposes.

7 DIMENSIONS

7.1 Hot-rolled steel bars shall be manufactured to any of the sizes between 5 to 120 mm, as agreed to between the manufacturer and the purchaser.

Examples of typical sizes are as given below:

Bars : 14, 15, 16, 17, 18, 19, 20, 21, 23, 27, 30, 33·5, 38, 40, 42, 45, 47, 53, 60 and 67 mm diameter.

Coils : 5·5, 6·0, 7·0, 8·0, 9·0, 10·0, 12·0, 14·0, 16·0, 18·0, 20·0, 22·0 and 23·0 mm diameter.

7.1.1 Hot-rolled round bars and coils of other sizes may also be supplied as agreed to between the purchaser and the manufacturer.

7.2 Dimensional Tolerances

7.2.1 The dimensional tolerances shall be in accordance with IS 3739 : 1987 for round, square and hexagonal bars. Tolerance grade is to be agreed between the manufacturer and the purchaser.

7.3 All bars shall be supplied with their ends sheared or saw cut.

7.3.1 Unless otherwise agreed, the length of the bars shall be 3-6·5 metres or in multiples with maximum of 10 percent short down to 1·5 metres.

7.3.2 *Cutting and Shearing Tolerances*

The tolerances shall not exceed limits given below for the ordered in exact length:

Nominal Size, mm	*Permissible Deviation*, mm
Up to 50	+ 75 − 0
Over 50	+ 150 − 0

8 DECARBURIZATION

Total depth of decarburization when tested as per IS 6396 : 1983 for hot-rolled bars and coils shall be 1·5 percent of the diameter per side and 2·0 percent in the annealed condition.

9 INCLUSION RATING

If required by the purchaser the inclusion rating of the bar shall be determined in accordance with IS 4163 : 1982. The limits for inclusion rating shall be agreed to between the purchaser and the manufacturer.

10 HARDENABILITY

If required by the purchaser, steel may be ordered on the basis of end quenched hardenability test in accordance with IS 3848 : 1981. In that case specification requirements shall be mutually agreed to.

11 GRAIN SIZE

The austenitic grain size, if specified, shall be tested in accordance with IS 4748 : 1968.

12 RETESTS

Should any one of the test pieces first selected fail to pass any of the test specified in this standard, two further samples shall be selected from the same lot for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material represented by the test samples, shall be deemed to comply with the requirements of that particular test. Should the test pieces from either of these additional samples fail the material represented by the test samples shall be deemed as not conforming to this standard.

13 BASIS FOR ORDER

While placing an order for the steels covered by this standard, the purchaser should specify clearly the following:

a) Steel grade;
b) Surface quality (Table 1);
c) Size;
d) Tests and test reports required;
e) Special requirements in regard to testing, packing, despatching, etc; and
f) Also provisions of **3.2**, if applicable.

14 MARKING

14.1 Each bar over 50 mm in diameter or of equivalent cross sectional area shall be stamped or suitably marked at one end with the cast number or any other identification mark by which the steel can be traced to the cast and heat treatment batch from which it was made.

14.1.1 Sizes below 50 mm diameter should be separately bundled.

14.2 Bars of 50 mm diameter or equivalent cross section and below shall be bundled as agreed to between the purchaser and the manufacturer. The metal tag attached to each bundle shall be marked as given in **13.1**.

14.3 The material may be marked with the Standard Mark. Details are available with the Bureau of Indian Standards.

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The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use oft he Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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